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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/735,151	12/12/2000	Gert W. Bruning	US 000309	4686

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EXAMINER

NGUYEN, HAU H

ART UNIT

PAPER NUMBER

2674

DATE MAILED: 10/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

H G

Office Action Summary

Application No.

09/735,151

Applicant(s)

BRUNING ET AL.

Examiner

Hau H Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4, 5. 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1-5 are rejected under 35 U.S.C. 102(a) as being anticipated by Hunter (U.S. Patent No. 5,724,062).

Referring to claims 1-5, Hunter discloses a LCD display device using an array of light emitting diodes as backlight. As shown in Figs. 1-4, Hunter teaches the display 20 has an array 25 of light emitting diodes ("LED") as a light source 30. The LED array 25 has a set of at least one red 32, one green 33, and one blue 34 LED, but preferably rows and corresponding columns of interspersed colors of LEDs 32, 33, 34, 35 as illustrated in FIG. 3 (see col. 4, lines 22-35). Hunter also teaches color filter may not be needed for the LCD display (col. 4, lines 45-46). The display 20 is also provided with the associated drive circuitry 200 necessary for selectably addressing individual liquid crystal pixels 70 of the LCD 60 and for sequentially and cyclically driving the LEDs 32, 33, 34. A set of one red 32 LED, one green 33 LED, and one blue 34 LED could be directly placed behind the individual selectably addressable liquid crystal pixel 70 to emit light therethrough (col. 5, lines 67-68 and col. 6, lines 1-6).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunter (U.S. Patent No. 5,724,062) further in view of Hochstein (U.S. Patent No. 5,783,909).

Referring to claims 6-8, Hunter teaches all the limitation of claims 6-8, as applied to claim 1 above, except for the drive and control circuit comprising a power regulated converter with control electronics having response time in the order of milliseconds.

However, Hochstein discloses a circuit for maintaining the luminous intensity of a light emitting diode including at least one light emitting diode (LED) for producing a luminous intensity; a sensor for sensing a condition proportional to the luminous intensity of the LED and for producing a luminous intensity signal, a power supply electrically connected to the LED for supplying pulses of electrical energy to the LED. The power supply includes a switching device responsive to the luminous intensity signal for adjusting the electrical energy supplied by the pulses per unit of time to adjust the average of the current passing through the LED to maintain the luminous intensity of the LED at a predetermined level (see col. 2, lines 6-18). Hochstein also teaches the circuit uses linear regulation of the LED current, the present invention uses pulse width modulation or frequency variation, or a combination thereof, of a power source to control the average current through the LED(s) (col. 4, lines 45-49), and switch mode supplies include any power source 16 that is turned on and off at a frequency consistent with the other operating

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parameters of the system. Typically, the switching frequency would extend from 60 Hz to over 50 KHz (col. 5, lines 1-5), which indicates the response time in the order of milliseconds.

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the circuit for driving array of LEDs as taught by Hochstein to incorporate to the LCD device as taught by Hunter in order to maintain the luminous intensity of the LEDs and increase the average current through the LED to compensate for a loss of luminous output, and vice versa (col. 2, lines 34-36).

5. Claims 9-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunter (U.S. Patent No. 5,724,062) further in view of Hochstein (U.S. Patent No. 5,783,909) further in view of Sakaguchi et al. (U.S. Patent No. 6,448,951).

Referring to claims 9-23, as cited above, Hunter teaches the LCD device with an array of LEDs as backlight, Hochstein teaches a circuit for regulating power through a pulse width modulation of current supplied to the LEDs. Thus, Hunter and Hochstein teach all the limitations of claims 9-23, except for the LED array comprising sub-arrays of red, green and blue LEDs, the drive circuitry regulating the light output of each sub-array independently of the others.

However, Sakaguchi et al. disclose a liquid crystal display device comprising: a liquid crystal display array divided into a first area, a second area and a third area, in each of which are included a plurality of pel lines; a first means for performing an operation for sequentially writing first color data, selected from data provided for red, green and blue, along the plurality of pel lines in the first area, an operation for sequentially writing second color data, selected from the data provided for red, green and blue, along the plurality of pel lines in the second area, and an operation for sequentially writing third color data, selected from the data provided for red,

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green and blue, along the plurality of pel lines in the third area; a backlight means, which is divided into N backlight sections (N is a multiple of 3 and is equal to or greater than 6) and which selectively generates red light, green light or blue light, wherewith N/3 backlight sections illuminate the first area, N/3 backlight sections illuminate the second area and N/3 backlight sections illuminate the third area; and a second means for sequentially activating the N/3 backlight sections for the first area to generate first color light and sequentially displaying the first color data in the first area, for sequentially activating the N/3 backlight sections for the second area to generate second color light and sequentially displaying the second color data in the second area, and for sequentially activating the N/3 backlight sections for the third area to generate third color light and sequentially displaying the third color data in the third area (see col. 1, lines 58-68 and col. 2, lines 1-18). Sakaguchi et al. also teach the second means controls the N backlight sections so as to sequentially display the color data written in the sub-areas during a period $1/F_f$ (F_f is a frame frequency) (col. 2, lines 51-53).

As shown in Figs. 1 and 2, Sakaguchi et al. further teach the backlight 4 is vertically divided into a plurality of backlight sections #0, #1, #2, ... in the TFT LCD array 3. One backlight section is assigned for a predetermined number of pel lines. The ON/OFF states of the individual backlight sections are independently controlled by the backlight driver 8. Basically, the backlight sections are sequentially turned on or off from the top to the bottom of the TFT LCD array 3. The LCD controller 7 supplies image data, i.e., R, G and B data, through three data ports to the data driver 6 for controlling the operation of the data driver 6, and controls the gate driver 5 and the backlight driver 8 by using control lines 14 and 15. More specifically, the LCD controller 7 transmits a shift clock across the control lines 14 and 15 to the gate drive 5 and

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to the backlight driver 8. A signal "duty," which represents the number of backlights that are turned on at the same time, and a signal "shift," which represents the shifting distance for the backlight section, are transmitted to the backlight driver 8 (col. 5, lines 45-68 and col. 6, lines 1-2).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the method of driving LEDs for backlight of LCD as taught by Sakaguchi et al. in combination with the power regulated converter as taught by Hochstein and incorporate in the LCD device as taught by Hunter in order to achieve a low cost LCD device that uses a currently available low cost write driver, and a low cost liquid crystal material (see col. 1, lines 51-55).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892 form.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hau H. Nguyen whose telephone number is: 703-305-4104. The examiner can normally be reached on MON-FRI from 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 703-308-6829.

Any response to this action should be mailed to:

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Commissioner of Patents and Trademarks

Washington, D. C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered response should be brought to Crystal Park II, 2121 Crystal Drive,
Arlington, VA, Sixth floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding
should be directed to the Technology Center 2600 Customer Service Office whose
telephone number is (703) 306-0377.

H. Nguyen

09/30/2002



Matthew C. Bella
Primary Examiner